4. AGENCY SPECIFIC ISSUES

The remainder of the findings and recommendations focus on issues at each of the individual agency IRM functions that were reviewed in depth as part of the performance audit. All data were gathered for the period from mid-February through May 1992 unless specified otherwise. All findings reflect conditions as of that period. The individual agencies reviewed are:

- Department of Environment, Health and Natural Resources

- Department of Human Resources

- Department of Public Instruction

- Department of Revenue

- Department of the State Treasurer

- Department of Transportation

- Employment Security Commission

- General Assembly

- Administrative Office of the Courts

DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES

The mission of the Department of Environment, Health and Natural Resources (EHNR) is to conserve the State's natural resources, protect the environment, and promote the public health through effective education of and service to the public, the voluntary actions of well informed citizens and responsible organizations, and the equitable enforcement of laws and regulations. The individual program divisions within EHNR are responsible for supporting certain program-specific information systems, particularly those that run on personal computers.

The Computer Systems Division (CSD) is responsible for planning and developing the department's mainframe, minicomputer, and PC based application systems, as well as administering the department's office automation system, telecommunications network, and computer training programs.

EHNR runs its major systems on the mainframe computer at SIPS. Some systems are also operating on the Data General minicomputer that primarily supports the department's office automation function.

There are 23 staff in CSD. Because of the small size of CSD, many large mainframe applications, including the Permits Application Tracking System, continue to be supported by SIPS' Application Development Services.

There are approximately 90 EHNR systems on the SIPS mainframe:

■ Environment has the largest share with approximately 70 systems

■ Health Services has 18 systems

■ Natural Resources has 3 to 5 systems

■ Administration has 5 to 7 systems

None of the systems are integrated.

Approximately 75 percent of the administrative and natural resource systems in EHNR are over 10 years old and have the following characteristics:

■ Poor documentation, with no flow charts or data flow diagrams

■ Assembler Language Code (ALC) - approximately one third of the programs are written in ALC

■ COBOL 68 or 74 - approximately two thirds of the programs are still in these old versions of COBOL, and they are poorly structured

■ Poor naming conventions

The Health Services application portfolio can be characterized as:

■ All systems are home grown

■ 40 percent are on-line IMS and 60 percent are batch with tape

■ 50 percent to 60 percent of the programs are over 10 years old, some over 16 years

■ Most programs are "spaghetti" code, totally unstructured

The environmental application system portfolio is characterized by:

■ ADF - 80 percent of the code and 300 modules

■ COBOL 74 - 3 percent of the code

■ FOCUS - 17 percent of the code

According to the CSD manager, some 60 percent to 90 percent of all the systems at EHNR need to be reengineered or redeveloped.

A number of new information technology initiatives are underway in EHNR:

■ Redesign of the Health Services Information System (HSIS) to run at SIPS under CICS

■ Redesign of the Water Supply Inventory System to meet revised reporting requirements

■ Design review of the Water Quality Compliance Monitoring System for the Division of Environment Management.

The major findings and recommendations concerning information technology and telecommunications within EHNR follow.

Finding 56 - EHNR does not have adequate data processing policies, procedures, and standards.

Policies and procedures in EHNR are only a loose collection of memos and word-of-mouth procedures. The Computer System Manager stated that he intends to develop a complete set of IRM policies and procedures. The only items that EHNR has addressed to date are:

■ Computer acquisition policy

■ Security policy and procedures

■ Work request procedures (not fully implemented)

A basic life cycle management (LCM) structure is defined, but is deficient in the following:

■ No needs-assessment task is identified

■ Business analysis is not addressed

■ Work products are identified, but their content is not described

■ No distinction is made concerning what needs to be performed for different sized projects

■ Structured techniques are not addressed; there are no:

    Structured walk-throughs
    User reviews

■ Responsibilities are not well-defined; users need to be brought more into the process

■ No milestone review points are defined

■ No tools or techniques are identified

No MIS standards exist in the department (e.g., COBOL coding standards).

Recommendation - Develop IRM policies, procedures, and standards.

EHNR should contact agencies like the Department of Public Instruction to review the policies, procedures, and standards that it has in place.

The current system development methodology at EHNR is much too high level to be truly useful in the design and development of systems. EHNR should either prepare a more detailed and comprehensive development methodology or purchase an existing methodology.

EHNR should give serious consideration to adopting Andersen's Method/1 as its life cycle management approach and the FOUNDATION CASE tools. Most of the large State agencies, including SIPS, have decided to standardize on this methodology and set of CASE tools. Further State standardization on a single LCM and set of CASE tools will make sharing resources and hiring information systems staff within the State easier.

Because the system development projects at EHNR tend to be small, the LCM methodology chosen should include guidance on how to apply the methodology to small development projects and maintenance efforts.

Finding 57 - The Permit Application Tracking System is at risk of not meeting EPA's reporting requirements.

The Permit Application Tracking System is one of EHNR's major environmental systems that implements EPA regulations and provides mandatory EPA reporting information. SIPS developed the Permit Application Tracking System for EHNR using the ADF programming language in the early 1980s when IBM was encouraging its customers to use the language. ADF is an old "fourth generation" language that is no longer supported by IBM. SIPS no longer has programmers knowledgeable in it. ENHR is unable to modify the system, and

must manually manipulate the system's output to meet EPA's current reporting requirements.

Recommendation - Investigate the potential of replacing the current Permit Application Tracking System with another state's system.

EHNR needs to replace this system. It should investigate acquiring a Permit and Compliance System from another state as a preferable alternative to redeveloping the system from scratch.

Finding 58 - EHNR does not have a rigorous quality assurance process in place.

There are only 18 programmer/analysts in the application programming area of EHNR. They do not have an independent quality assurance function, and the internal development process is informal. Most testing is done by the same programmer who performed the system modifications. EHNR does not use formal structured walk-throughs.

Recommendation - Develop a formal quality assurance program.

EHNR should develop a formal quality assurance process and imbed it into the development and maintenance of systems. The application systems group is too small to have an independent quality assurance function. However, it can implement more formal quality assurance and control functions within the group.

EHNR should also implement a life cycle management methodology and a set of standards against which to design and develop systems and programs. To ensure that these standards are followed, EHNR should institute a formal structured walk-through process for both maintenance and new system development efforts.

EHNR should develop a more formal test environment that includes:

- Formal test plans for all major modifications and new system development efforts

- Formal independent programmer walk-throughs of code changes

- Use of standard data test beds

- Formal system testing by an independent computer system analyst, and end-user acceptance testing

Finding 59 - CSD is not officially responsible for supporting personal computers.

According to the Manager of CSD, his group does not have the formal responsibility for supporting PCs because CSD is understaffed. He stated that CSD will attempt to help PC

users when they have time. Discussions with the Natural Resource and Administrative Support group in CSD indicated that a significant amount of its time is spent supporting PCs.

Recommendation - Assign CSD responsibility to support PCs.

EHNR should recognize the need for CSD to actively support its PC users and should provide the division with adequate resources to properly perform this function. EHNR and CSD cannot ignore the support needs of the PC users, especially given the growing number of LANs being installed in EHNR. The department must recognize that its users will need support from CSD and that resources need to be committed to this function if the department is to realize the benefits this technology will bring to the accomplishment of its mission.

Finding 60 - No formal Help Desk and problem reporting system is available in EHNR.

EHNR does not have a formal Help Desk, although the Natural Resource and Administrative support group in CSD tries informally to serve this function. EHNR also does not have a formal problem reporting system.

Recommendation - Establish a formal Help Desk and a problem reporting and tracking system.

EHNR should establish a formal Help Desk under the Natural Resource and Administrative support group and should properly staff it.

EHNR should also implement a formal automated Problem Tracking and Reporting system. An individual in the Natural Resource and Administrative support group should act as a dispatcher. The dispatcher function should receive all help and problem related user calls and log them into an automated problem tracking system. The dispatcher should resolve the problem directly if possible, or route the request for help or problem resolution to the appropriate individual in the telecommunications, operations, security, or applications area.

The tracking system should be capable of recording such information as who initiated the call, when the call was received, type of problem encountered, who the problem was referred to for resolution, problem resolution arrived at, and the date the problem was closed. Formal closing of all problems should include contacting the user with the solution and closing the problem report on the automated system.

Problem tracking reports should be produced and analyzed to determine trends and to track the timely resolution of problems.

Finding 61 - Most CSD job descriptions are out-of-date.

Most of the job descriptions in CSD are dated 1986, with the Data Processing Assistant II and Technical Systems Coordinator position descriptions dated 1978. All job descriptions that have a minimum requirement for a college education and some computer training also have a clause stating "or an equivalent combination of education and experience." None of these job descriptions explains what constitutes "an equivalent combination of education and experience."

Recommendation - Update CSD job descriptions to reflect the current needs of the organization.

EHNR should review its job descriptions and specify what minimum combination of education and experience equates to a four-year college education. Also, where a four year college degree is mandatory for a position, the clause "or an equivalent combination of education and experience" should be removed.

Finding 62 - EHNR program offices make many of the automation funding decisions without the participation of CSD.

Many of the program offices make automation funding decisions during meetings with EPA, without the involvement of CSD. The program offices then tell CSD what must be done for that funding level. Sometimes inadequate funding is available to properly perform the project.

Recommendation - Systems planning should be a joint effort between the program offices and CSD.

CSD should participate in all program office meetings that will result in the commitment of funds or resources to automation initiatives.

Finding 63 - EHNR does not provide enough training for its computer systems staff.

EHNR does not have mandatory training requirements for the positions in CSD, nor a record of training received. Staff members have received some limited management oriented training (e.g., EEO requirements). However, no training has been provided in structured analysis and design techniques, and only limited amounts in structured programming. No training has been provided in CICS or DB/2.

Recommendation - Mandate and track training requirements for all CSD positions.

EHNR should invest in the training required to bring the staff to full qualification. Training is needed in VSAM, CICS, COBOL II, and DB/2.

Finding 64 - The production control function within EHNR is fragmented.

Production control at EHNR is handled by the programmers or the user divisions (coordinators), not by a central production control function in CSD.

Recommendation - Centralize the production control function within CSD.

An organization in CSD should be formed to handle production control for the department. This will provide for a single point of contact between SIPS and the department. It will also enable staff to be trained and become skilled in the SIPS automated scheduler, ZEKE.

Finding 65 - The Automated Systems Review Board does not have a formal charter.

EHNR has established a steering committee called the Automated Systems Review Board that is comprised of:

- 2 deputy secretaries

- 4 assistant secretaries

- The computer systems manager

There is no charter for the board, and the board does not meet on a regular basis. The board has met only 5 times in total.

Recommendation - Formalize the role of the Automated Systems Review Board.

EHNR should continue its Automated Systems Review Board, but should formalize its role and process by developing a charter for the organization. The charter should address the types of issues and decisions that the board should be addressing and CSD's reporting responsibility to the Board. Also, meetings should be scheduled on a regular monthly basis.

DEPARTMENT OF HUMAN RESOURCES

The mission of the Department of Human Resources (DHR) is to provide services that benefit all North Carolina citizens as individuals, families, and communities in their effort to achieve and maintain health, social and economic well-being, and self-respect.

The Division of Information Systems (DIS), reporting to the Assistant Secretary for Budget and Management, is responsible for planning, developing, and maintaining the information technology systems and initiatives in the department.

The data processing needs of DHR are primarily supported by the mainframe computer at SIPS. All major production application systems are run on this computer. DIS recently installed a local area network and new work stations to support the system development efforts of the division. The new LAN and work stations will be used to run the FOUNDATION CASE tools and support the design and development of systems and software to be run on the SIPS mainframe computer. DHR has implemented a number of LANs throughout the Dix Campus and downtown office buildings to support office automation functions.

There are six application system teams organized around program offices/clients. Social Services has 4 teams supporting it. The majority of the applications system effort is devoted to the maintenance and modification of the existing production systems. DIS allocates its programmer resources as follows:

- 65 percent maintenance

- 20 percent major modifications

- 10 percent new development

- 5 percent planning systems/programs

System modifications can be required as a result of actions by federal agencies, the General Assembly, State courts, or the executive branch.

There are approximately 70 systems supported by DIS. The key characteristics of the DHR systems are:

- 90 percent of the batch programs are COBOL

- The other 10 percent of the portfolio is written in EASYTRIEVE.

- Data management is split across several technologies:

VSAM 45 percent

IMS 45 percent

DB/2 10 percent

- The on-line systems are:

  35-40 percent COBOL CICS

  50-55 percent IMS DC

  10 percent CSP SQL

The current major system initiatives are the migration of new software packages into DHR:

- Child Support Enforcement system

- Food Stamps system

- Eligibility Information system (EIS)

The major findings and recommendations concerning information technology and telecommunications within DHR follow.

Finding 66 - DIS' programmers and analysts require additional training in FOUNDATION CASE tools.

DIS is embarking on a new development environment using LAN-based work stations, Method/1 life cycle methodology, and FOUNDATION CASE tools. This will require learning new ways of performing analysis and programming functions.

The analysis and programming staff have not yet been provided all the training they need for this endeavor. The application systems group has had only a few staff trained in Method/1. They have had no training in the FOUNDATION CASE Tools: Design/1 and Install/1. According to DIS management, training on these tools is scheduled to begin after the LAN and new work stations have been installed. The new equipment is required to implement the CASE tools.

The application group also indicated a need for training in PC/Windows and DOS.

Recommendation - Proceed with the comprehensive training program in CASE tools.

DIS should continue with its plan to send its analysis and programming staff through the training necessary to become competent in this environment. The training should start as soon as the new development LAN is in place and should include training in the LAN and new work stations, including DOS and WINDOWS; Method/1 (as modified by DIS); and the FOUNDATION tools -- Design/1, Install/1, Microsoft Project, etc.

Finding 67 - Many of the applications at DHR are very old, unstructured, poorly documented, and not implemented in the current version of the programming language.

Many applications are more than 15 years old. The problematic characteristics of the DHR systems are:

■   90 percent of the batch programs are COBOL, but approximately 90 percent of those are still in COBOL 74 (1974); only 10 percent are written in COBOL II (1985)

■   The source code is unstructured and poorly documented

As a result, programs are more difficult to understand and maintain and require more effort to make changes. They also present a higher potential for error.

Recommendation - Investigate reengineering production COBOL systems to improve maintainability.

There are a number of automated tools available today that can assist DHR in the automated reengineering of the current production COBOL systems. COBOL code that has been reengineered to be well-structured, less complex, more modular, smaller in size, compiled under the current version of the language, and using standard data names is significantly easier and less risky to maintain and modify.

Finding 68 - DHR does not have adequate control over its report distribution process.

There are no output distribution instructions within DIS, and most production reports do not have unique numbers to identify them to the operators. Correct distribution of the reports depends on the knowledge of the operators. Approximately 800 different reports are produced by DHR, and many of the reports have similar titles.

Recommendation - Implement controls over distribution of reports.

DIS should review its production reports and institute adequate controls to properly manage their distribution. Each report should have a unique number to identify it. Output control procedures need to be prepared concerning the distribution of these reports.

Finding 69 - DHR spends significant amounts of money to generate paper reports.

DHR prints, processes, and mails a large number of hard copy reports to the counties. It spends approximately $230,000 a year just for the paper for these reports. It is unknown if these reports are used, and which could potentially be eliminated.

Recommendation - Study possibilities of eliminating some reports and providing counties on-line access to remaining reports.

DIS should perform a cost-effectiveness study to determine which hard copy reports could be eliminated and how to provide the counties on-line access to the necessary information. These steps can potentially save significant sums of money in eliminated processing, printing, and mailing costs.

Most counties have terminals, and the information on these reports could be reviewed on-line. Counties without terminals could be given 3270 dumb terminals at marginal cost.

Finding 70 - Production control is fragmented within DHR.

Production control/job scheduling in DIS is limited to the batch DSS and DMA jobs that include:

■ Social service checks

■ Medicare ID cards

All other DHR divisions and programs are responsible for their own production runs.

Recommendation - Centralize all DIS production control and scheduling under the computer operations group.

This will formalize the production control process, ensure consistency in running production jobs, and establish a single point of contact for production support between DHR and SIPS.

Finding 71 - DHR production job streams are undocumented and require too much manual intervention by the operators.

DHR uses the automated job scheduler at SIPS, ZEKE, for only some 30 percent of its jobs. The remaining 70 percent are released manually via TSO. The documentation concerning these job streams is either very old or, in some cases, non-existent. The correct running of these jobs is heavily dependent upon the personal knowledge of the individual operators.

DHR production procedures and job streams are based on second generation techniques requiring far more manual intervention and involvement of operators and programmers than is normally required in modern data center environments. For example:

■ The production runs do not use check-point restart procedures. When a system fails, the scheduler calls the programmer responsible for it. The scheduler is unable to correct even a simple error condition independently.

■ Approximately 80 percent of the systems at DHR require manual set-up. The job streams require frequent operator intervention. Nearly all of the job streams require control parameters to be entered by the DHR schedulers. These parameters are in various, non-standard formats. Parameters are not passed between programs, and must be re-entered multiple times.

Recommendation - Reengineer production job streams and automate scheduling.

DHR should evaluate its production job streams and run procedures and reengineer the job streams by removing scheduler/operator parameter interventions wherever possible. Long job streams should have documented check-point restart procedures, and all job streams should be documented. Procedures for job recovery should be part of these procedures.

Once the job streams have been cleaned up, the DHR schedulers, working with the programmers, should migrate as many of the production runs as possible to ZEKE for scheduling.

Finding 72 - The check processing procedures at DHR require movement of the checks, which creates undesirable exposure of negotiable instruments.

The following steps constitute the check processing practice at DHR:

■ The checks are stored in the warehouse where centralized printing is done and are secured in a locked facility in that building. Only four people know the combination to the check locker (print shop and forms inventory people).

■ A manual log is maintained of all checks that are processed at the print facility.

■ Unsigned processed checks are transported by a DHR courier downtown for review and voiding of duplicates by the accounting staff.

■ The checks are sent back to the warehouse where they are signed and mailed.

Although the checks are moved by courier in each direction, the movement creates undesirable exposure.

Recommendation - Explore potential adjustments to check handling practices to minimize the movement of negotiable instruments.

The accounting staff reviews the checks at their office because the information files for validation are there. One potential alternative would be to send the check register report in place of the actual checks. After completing the review, the accounting staff could then go to the warehouse to pull and void any duplicate checks identified from the register. That would eliminate two instances of exposure of negotiable instruments, from the warehouse to the program office and back again.

If checks continue to move between the locations, sign-off logs should be used when control of the checks is passed between DHR units.

Finding 73 - DIS' information systems policies, procedures, and standards are out of date.

The document (multi-binders) called Specification of Responsibility and Organization (SRO) for DIS is the division's policies, procedures, and standards manual. The copy reviewed for the performance audit was dated November 2, 1988. It appeared to have been updated last on February 6, 1990. Material changes in DIS' operation are not reflected in the SRO. For example, the SRO contains instructions dated September 1981 on how to prepare the annual AIS 5-year plan, while other memos concerning this plan preparation process were dated 1992.

The SRO contains the following volumes:

- Volume I - SRO Internal Functions - includes items such as:

    Annual AIS 5-year plan instructions

    Information center

    Budget expansion instructions

    Procurement

    Hardware and software support

- Volume II - SRO External Functions

- Volume III - Administrative Procedures

- Volume IV - Standards

- Volume V - System Development Requirements

- Volume VI - Obsolete (not even referenced in the SRO provided)

- Volume VII - Technical environment policies (not referenced in the SRO provided)

DIS stated that Volumes I, II, and III should not be reviewed because they are no longer applicable, and that Volume V is now outdated with the decision to go to Method/1 and FOUNDATION. Review of all volumes indicated the following:

- All volumes contain important subject matter necessary for the efficient and effective operation of DIS operations

- The organization and structure of the volumes make them difficult to read and follow

- Discussions with DIS staff indicate that these documents are not consistently or completely followed

DIS had already recognized the problems with the SRO, initiated a survey to assess its use and value, and a formal process to update the department's policies, procedures, and standards. DIS has already revised the Method/1 LCM for the production system support phase to better meet the organization's unique needs. It is currently tailoring the software package phase.

Recommendation - Accelerate overhaul of the SRO.

DIS should continue to update and reorganize its policies, procedures, and standards. To the extent possible, it should give the effort a higher priority and dedicate more resources to its completion. In the interim, DIS should issue a memo clarifying which of the policies, procedures, and standards in the SRO are still current.

Finding 74 - DHR has two organizational units providing data processing support; and their roles and responsibilities are not well defined.

Two separate organizations provide information systems and automation support to the department:

- Division of Information Systems (DIS)

- DHR Automation Projects Group

Both of these organizations report to the Assistant Secretary of Budget and Management, who in turn reports to the Secretary of DHR. According to the Assistant Secretary, the role of DHR Automation Projects Group is changing to a policy and inter-division planning function, and DIS will remain the service delivery group for DHR.

Previously, the DHR Automation Projects Group had led the effort to modernize the Eligibility Information System (EIS), one of the largest and most important systems in the department. It currently has programmatic staff assigned to run the EIS.

Recommendation - Clarify and formalize the new role for the DHR Automated Projects Group.

DHR should formalize and document the new role that the DHR Automated Projects Group is to play in the IRM area and should change its name to better reflect that role.

EIS operational personnel should be transferred to the appropriate programmatic divisions, and the organization should be staffed with the necessary skills to perform its new function.